Chapter 16
E-Governance and Social Inclusion:
Community E-Centers in the Philippines

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ABSTRACT

This chapter presents a case study of community e-Centers in the Philippines. Developed as part of the pilot multi-purpose community centres program in the late 1990s and expanded as part of Philippine Development Plans, the centres were envisaged as local entry points for residents to access information and services, especially in rural areas of the country. The case study touches on the problems when content lags behind the provision of hard infrastructure, a problem associated with many e-government projects, especially in less-developed countries.

INTRODUCTION

Social exclusion haunts people and communities that suffer not only from low income levels but also from the lack of access to quality education, health, governance, and information services. In a growing information society, access to information and communications technology (ICT) including the Internet is seen as crucial in battling social exclusion. In the Philippines, poor Internet penetration is reflected in the low degree of Internet access of households. E-governance strategies that promote digital inclusion can help reduce levels of social exclusion.

This chapter seeks to find out how e-governance strategies that aim to enhance the digital connectivity of disadvantaged populations contribute to social inclusion. Specifically, it will examine whether the implementation of an e-governance strategy anchored on the establishment of Community e-Centers have led to the realization of digital inclusion outcomes that promote social inclusion. In this regard, it will consider how input variables such as the quality of investments in ICT infrastructure, skills training, and content development, together with process variables like program management, stakeholder participation, and strategic planning, affect digital inclusion out-

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Chapter 17
Social Inclusion and the Digital Divide: Case of Korea

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ABSTRACT

It is becoming more important to better utilize various resources as digital convergence and informatization progresses. Therefore, it is a necessity to show the qualitative differences regarding digital divide, and relevant policies and efforts need to be strengthened to narrow the digital divide. In this regard, the overall improvement of information literacy of the public is required as it can increase the convenience in citizens' everyday lives and can create added value. It is, therefore, necessary to continue the development of policies and projects to narrow the digital divide. The Korean government plans to keep strengthening its support with policies to legislate regulations that narrow the digital divide and provide fair opportunities to access information and to improve information literacy. The efforts to narrow the digital divide and effective policies to achieve the goal must be continued to relieve social conflict and integrate the society. This is explored in this chapter.

INTRODUCTION

Information and communication technologies (ICTs) have developed since the late 20th century, rapidly changing the lives and ways of thinking of mankind and ushering in the information society with a wholly new paradigm that differs from the existing industrial society qualitatively. The information society is meaningful in itself when the social value of information gets higher, and the socialization of information is realized. In other words, the realization of an ideal information society depends on how a change there is in individuals' perception, attitude, values, and behaviors that harmonize with changes in the information environment. However, as the penetration and usage of ICTs, including the Internet have increased, the digital divide, one of the side effects, has emerged as a social issue.

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The widening of the digital divide causes the gap in information literacy and economic activity, which, in turn, leads to inequality in opportunities of communication and participation, hindering social inclusion and damaging social values and foundation needed to enter the line of advanced countries. Bridging the digital divide has become an important informatization policy area for both the strengthening of national competitiveness and social welfare. The digital divide brings about and increases inequality among classes and regions, and reduces the economic and social benefits created as a result of ICT development. A country therefore needs to consider the issue as a national challenge and approach it from the perspective of balanced growth and inclusion.

Korea has developed and promoted timely informatization plans in line with the global informatization trend in efforts to become an ICT-based advanced country. Additionally, it has actively promoted e-government programs since 2001 with aims to improve the efficiency and transparency of government administration and to dramatically enhance services for the public and businesses. As a result of such efforts, the ICT industry has become a key driver in Korea's overall competitiveness. E-government programs have changed the living environment of the public, but at the same time, caused problems related to the groups that have obstacles in using ICTs. In this regard, the government has endeavored to resolve the digital divide and other problems that can be raised as informatization spreads across the country by promoting policies to improve accessibility for the public and a paradigm shift in informatization.

This article examines the current status in terms of informatization and the digital divide in Korea, and studies policy measures to resolve the digital divide or information inequality. Furthermore, it tries to prove that the measures will not only narrow the digital divide but also contribute to social inclusion.

CURRENT STATUS AND ANALYSIS MODEL OF DIGITAL DIVIDE

Concept of Digital Divide

The concept of the digital divide can be defined in various ways, depending on the subjects, levels, etc.

First, the OECD defines the digital divide as the gap in the information infrastructure, and approaches the global digital divide with four indicators: access to ICTs and the Internet; the price of access; using the Internet; alternative Internet access (OECD, 2001, pp.12-23).

While the World Bank (2001) suggests the effective management of technology investment capital as a solution to the global digital divide, APEC approaches the digital disparity from the perspective of the information technology gap. The digital divide is also explained as the "gap in access to information devices". Jin Sang-gi (2003) defines the global digital divide as the "gap in the infrastructure, use, and accessibility with regard to information and communications among individual countries as a result of different national informatization levels."

When comprehensively considering the concepts discussed above, the digital divide refers to the "gap between people who obtain and use information through computers and those who do not" in a narrow sense, and the "phenomenon that inequality in information acquisition causes the disparity of wealth" in a broad sense. In this regard, there are a few things to know in relation to the concepts.

First of all, there is a need to recognize the digital divide by separating people in a dichotomous way, namely those who enjoy the benefits of information and those who do not. In other words, the divide between the two groups is not a 'common and possible difference' but a 'problematic and meaningful difference'. So therefore, the policy target is the latter, i.e. the group isolated from the benefits of information.

Second, the digital divide is about the gap in terms of digital information, not general information, which has been considered important since the beginning of human history.

Third, it is important to give a value to the digital divide. The concepts of the digital divide involve negative ripple effects of informatization. The more informatization progresses and the wider the digital divide gets, the larger disadvantages information have-nots are exposed to. Therefore, the concept of the digital divide should include not only the information accessibility gap but also the information use gap. What is important in the digital divide is not the possession of or access to information devices itself, but whether people obtain information by accessing to information devices, change them into knowledge, and use the knowledge to improve their socio-economic status. The reason why we are concerned about the digital divide is due to the circular causality where the gap in access to information leads to the gap in information literacy and determines the level of participation in the digital economy, and ultimately links to the gap in wealth and human resources.

Fourth, the global digital divide comes from the socio-economic differences among countries. Researchers emphasizing the broad concept of the digital divide have classified groups by income, education, age, race, geography, etc. and these criteria mean the factors that cause the difference in the ability to adopt informatization. They have also studied the socio-economic characteristics and structural limits for information have-nots in adopting informatization.

Analysis Model of Digital Divide

The concept of the digital divide can be described by using the information demand and supply equilibrium model, a conceptual framework for information policy. The model can be practically utilized to analyze the digital divide within a country or to compare the digital divide among countries.

The digital divide is largely broken into the information demand divide, the information supply divide, and the information policy divide. First of all, the information demand divide is subdivided into the information awareness gap, the information literacy gap, and the information purchasing power gap. Second, the information supply divide is subdivided into the gap in the base for information transmission, the gap in the base for information distribution, and the gap in the base for information application. These gaps in the supply base are rooted in the gap in core technologies for information and communications and the gap in the technical workforce base. Finally, the sub-concepts of the information policy divide include the gap in the information policy implementation system, the gap in the legal and institutional foundation, etc.

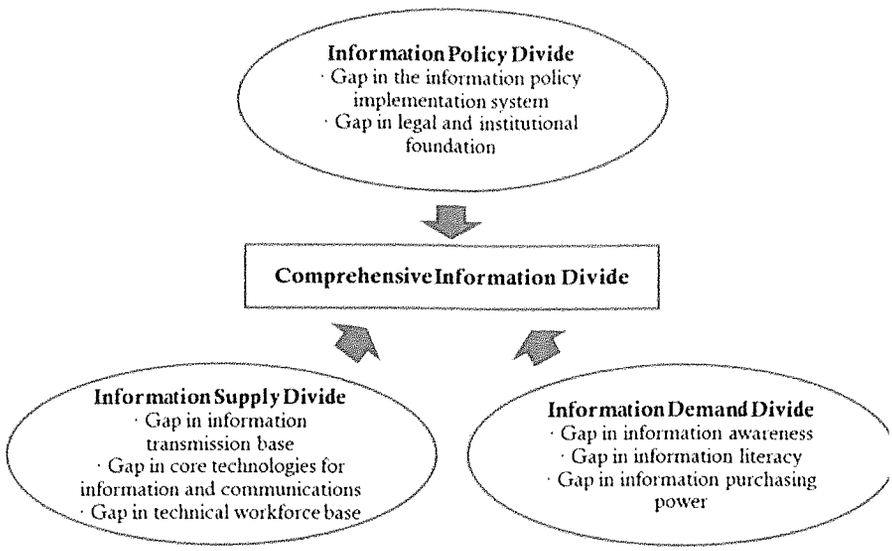
The comprehensive analysis of the digital divide among countries is enabled by connecting the information demand divide, the information supply divide, and the information policy divide. These three areas are interconnected, but the information policy divide, basically impacts the other two (see Figure 1).

CURRENT STATUS OF DIGITAL DIVIDE AND CHALLENGES

Information Supply Divide: Expanding Infrastructure

Until the early 1990s, fixed telephone lines were almost all the ICT infrastructure that consisted in Korea, and the main infrastructure such as the Internet and mobile telecommunications lagged behind advanced countries including the US, Japan, and European countries by more than ten

Figure 1. Comprehensive analysis model for concept of digital divide



years. In particular, the number of Internet users was less than one thirtieth of that in the US, which was why the ICT infrastructure needed to be improved so urgently at that time.

In order to close the ICT infrastructure gap, the Korean government embarked on the construction of high-speed information and communications network in 1995. The project was carried out successfully for 11 years until 2005 with a budget of KRW 805.5 billion. As a result, the number of Internet users in the country increased from 366,000 in 1995 to over 33 million in 2005, and the number of high-speed Internet subscribers per 100 inhabitants marked 25.4 persons in 2005, ranking No. 1 in an OECD survey at that time. After the successful construction of the high-speed network, the government promoted a project to build a 100 Mbps broadband convergence network (BcN) from 2004 to 2010 in preparation for a broadcasting and communications convergence society. And

Table 1. Internet usage by country

Category	Korea	US	Japan
Number of Internet Users per 10,000 Inhabitants	22.33	671.15	42.59

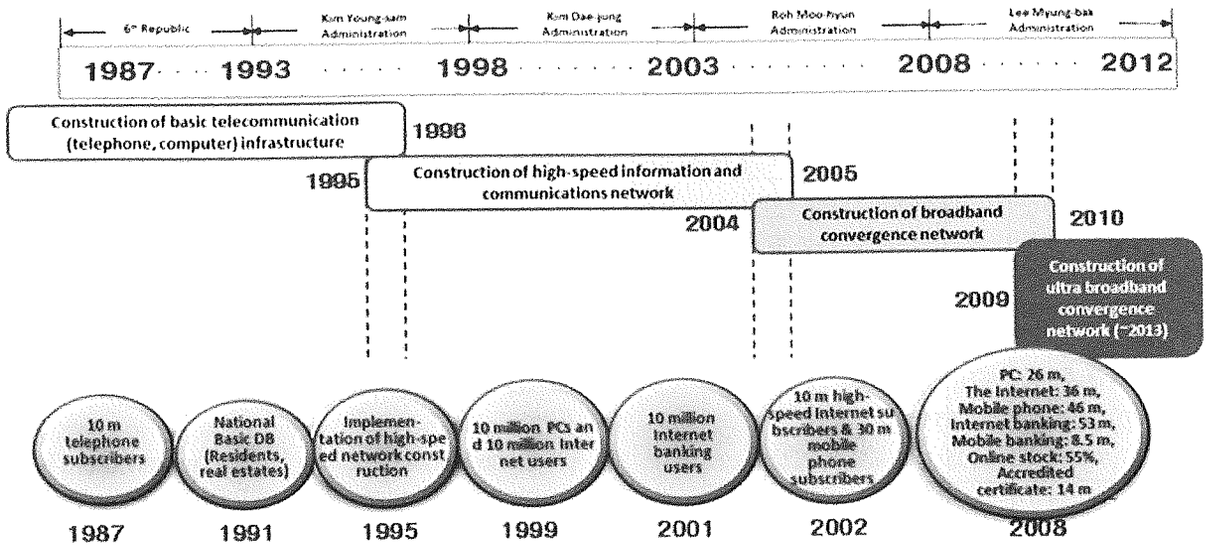
Source: ITU (1994)

Table 2. ICT infrastructure development level by country (1995)

Category	Korea	US	Japan
Number of Internet Users	366,000 persons	25 million persons	2 million persons
Number of Internet Hosts	40,000 hosts	6,053,000 hosts	269,000 hosts
Number of Installed PCs	4,857,000 units	86,300,000 units	15,100,000 units
LAN Access Rate of PCs	2.0%	52.0%	8.6%
Number of Mobile Phone Subscribers per 1,000 Inhabitants	37 persons	282 persons	54 persons
Number of CATV Subscribers per 10,000 Inhabitants	32 persons	6,102 persons	221 persons

`Source: National Computerization Agency, 'History of High-Speed Network Development' (2003)

Figure 2. Major ICT infrastructure construction policies for last 20 years



since 2009, it has made efforts to provide Giga-level Internet service, which is at most 10 times faster than BcN, with an aim to accommodate broadcasting and communications traffic that is becoming high-quality and high-capacity due to increasing 3D TV and UD TV adoption.

Information Demand Divide: Improving Information Literacy

As of 2010, the average Internet usage rate of the socially disadvantaged (the disabled, low-income group, the elderly, and rural residents) was 44.3%, up by 1.3% compared with the previous year, and the gap with the rate of the general population (78.3%) was 34.0%, down by 0.6% year-on-year. The Internet usage rate of the socially disadvantaged increased every year, finally reaching 44.3% in 2010, up by 19.4% from 24.9% in 2004. The gap with the general population in terms of the Internet usage rate decreased to 34.0% in 2010, down by 11.3% from 45.3% in 2004.

As for the Internet usage rate by sub-group of the socially disadvantaged, low-income group showed the highest rate at 56.5% (up 0.8%p year-on-year), followed by the disabled 53.5% (up 0.8%p year-on-year), the elderly (up 1.7%p year-on-year), and rural residents (up 1.3%p year-on-year). Like the comparative level of the socially disadvantaged to the general population, the

Internet usage rate of rural residents were lowest due to their demographic characteristics, namely high proportion of older people, less-educated people and population residing in vulnerable areas such as small towns. By contrast, the low-income group marked the highest Internet usage rate, based on its demographic characteristics, including high proportion of younger people.

- **Proportion of People aged 60 and Over:** Low-income group (30.8%), the disabled (46.2%), rural residents (54.1%)
- **Proportion of People aged 30 and Less:** Low-income group (39.7%), the disabled (16.8%), rural residents (8.2%)

The Gap is the difference between the Internet usage rate of the general population and that of the socially disadvantaged, and 'average' is a weighted average that takes into account the sizes of sub-groups of the socially disadvantaged.

Table 3. Internet usage rate of the socially disadvantaged and gap with general population (%, %p)

Category		2002		2003		2004		2005		2006		2007		2008		2009		2010	
		Usage Rate	Gap	Usage Rate	Gap	Usage Rate	Gap	Usage Rate	Gap	Usage Rate	Gap	Usage Rate	Gap	Usage Rate	Gap	Usage Rate	Gap	Usage Rate	Gap
General Population		59.4	-	65.5	-	70.2	-	72.8	-	74.8	-	76.3	-	77.1	-	77.6	-	78.3	-
Socially Disadvantaged	Disabled	22.4	37.0	27.6	37.9	34.8	35.4	41.0	31.8	46.6	28.2	49.9	26.4	51.8	25.3	52.7	24.9	53.5	24.8
	Elderly	9.3	50.1	13.0	52.5	19.3	50.9	22.5	50.3	28.3	46.5	34.1	42.2	35.6	41.5	37.6	40.0	39.3	39.0
	Low-income group	22.9	36.5	31.7	33.8	38.4	31.8	44.2	28.6	48.4	26.4	52.8	23.5	54.6	22.5	55.7	21.9	56.5	21.8
	Rural residents	11.9	47.5	16.2	49.3	16.9	53.3	23.0	49.8	29.4	45.4	33.4	42.9	35.2	41.9	36.2	41.4	37.5	40.8
	Average	14.1	45.3	19.2	46.3	24.9	45.3	29.4	43.4	35.1	39.7	40.1	36.2	41.7	35.4	43.0	34.6	44.3	34.0

Source: 2002~2010 Digital Divide Status Survey (NIA), 2002~2010 Internet Usage Status Survey (KISA)

The results by age group showed that the Internet usage rate of people aged 50 to 59 was 57.6% (up 1.7%p year-on-year), whereas that of people aged 60 and over was 24.3% (up 2.5%p year-on-year). People aged 60 and over with the high proportion of less-educated people, people residing in small towns, and economically inactive population showed a low Internet usage rate compared to people aged 50 to 59.

Information Policy Divide: Enacting Laws

Over the last decade, the Korean government has promoted informatization policies, focusing on the development of the information and communications industry as a new industry that would lead to both growth and employment. However, an increasingly large number of people have become information have-nots due to their socio-economic, regional or physical conditions. Not only that, the digital divide by age group, income, and education level has widened. To resolve these problems, the government has adopted a policy for bridging the digital divide since 1996 when national informatization began to be promoted out of need for welfare, social inclusion, and national efficiency. The actual implementation of the policy began on April 6, 2000 when the 4th Informatization Strategy Meeting was held to propose a master plan for constructing a knowledge and information powerhouse.

Along with the adoption and implementation of the policy for narrowing the digital divide, there were movements to develop a comprehensive legal framework with the aim of constructing a curative and preventive government-wide system to respond to the digital divide. At the time, clauses related to the bridging of the digital divide were scattered in Article 16 (2) of Framework Act on Informatization Promotion, universal service-related articles of Telecommunications Business Act, information access-related articles of Welfare of Disabled Persons Act, etc. However, these provisions were rather promulgated. Against this

backdrop, a new law came into being as the Act on Bridging Digital Divide was enacted in January 2001 in part, to focus efforts to establish legal grounds for guaranteeing the continuity of policy. The Act was revised to establish an effective policy delivery system that can respond to changes in the digital divide environment.

The Act on Bridging Digital Divide was aimed at realizing constitutional rights such as the rights of human dignity (Constitution of the Republic of Korea, Article 34) and of equality (Constitution of the Republic of Korea, Article 11) by expanding the concept of 'bridging of digital divide' from just ensuring access to physical environment to advancing information literacy. It has also been the basis of national actions to ensure access to information for low-income people, residents of rural areas, disabled people, elderly people, women, etc.

However, after the launch of the new government in 2008, multiple ministries came to share national informatization-related business, which had been carried out solely by the former Ministry of Information and Communication (MIC), and the Working-level Committee on Informatization Promotion began to revise informatization-related laws, including the Act on Bridging Digital Divide.

The Ministry of Public Administration and Security (MOPAS) transferred the provisions related to the information and communications industry and network to the ministries concerned in an effort to arrange laws in accordance with government reshuffle. It also drafted the Framework Act on Informatization Promotion ('08.4~6), which integrates the Act on Bridging Digital Divide and the Framework Act on National Informatization, under four principles: public-private collaborative governance; informatization based on com-

Table 4. Internet usage rate of the elderly by age group (%)

'07	'08	'09	'10	'07	'08	'09	'10
51.7	53.5	55.9	57.6	18.7	20.0	21.8	24.3

Table 5. Enactment and amendment to act on bridging digital divide

Enactment (2001.1.16)	1st Partial Amendment (2002.12.18)	2nd Partial Amendment (2005.12.30)	Framework Act on National Informatization (2009.5.22)
• Established a comprehensive plan and an implementation plan for bridging digital divide. • Established the Committee on Bridging Digital Divide. • Promoted development of technologies to guarantee the use of information and communications service for the disabled and the elderly. • Provided ICT devices to information have-nots. • Established and operated ICT centers. • Conducted ICT education.	• Created conditions for using high-speed information and communications service. • Conducted research for developing policy for narrowing digital divide. • Conducted digital divide status survey. • Established Korea Agency for Digital Opportunity and Promotion.	• Changed the title to "Act on Bridging Digital Divide.' • Defined terms related to bridging of digital divide. • Made it mandatory for ICT manufacturers to design, make, and process ICT products that consider accessibility and convenience for information have-nots. • Established an expert committee on bridging digital divide. • Conducted digital divide status survey.	• Transferred the core provision of "Act on Bridging Digital Divide" to Paragraph 1, Chapter 4 of "Framework Act on National Informatization." • Priorities in regard to the master plan for national informatization, implementation plan, and projects for bridging digital divide were decided by Presidential Committee on National Informatization Strategy. • Reinforced the guarantee of Web accessibility for government agencies. • Made it mandatory to try to purchase ICT products that guarantee information access and convenience.

Source: Digital Opportunity & Culture White Paper (2009), National Information Society Agency

munication and convergence; consideration of adverse effects of informatization; and utilization of information. A public hearing on the proposed amendment was held in September 2008, and the Parliament passed it on April 30, 2009.

CASES OF KOREAN TERMS OF BRIDGING OF DIGITAL DIVIDE AND SOCIAL INCLUSION

Policy for Expanding Infrastructure

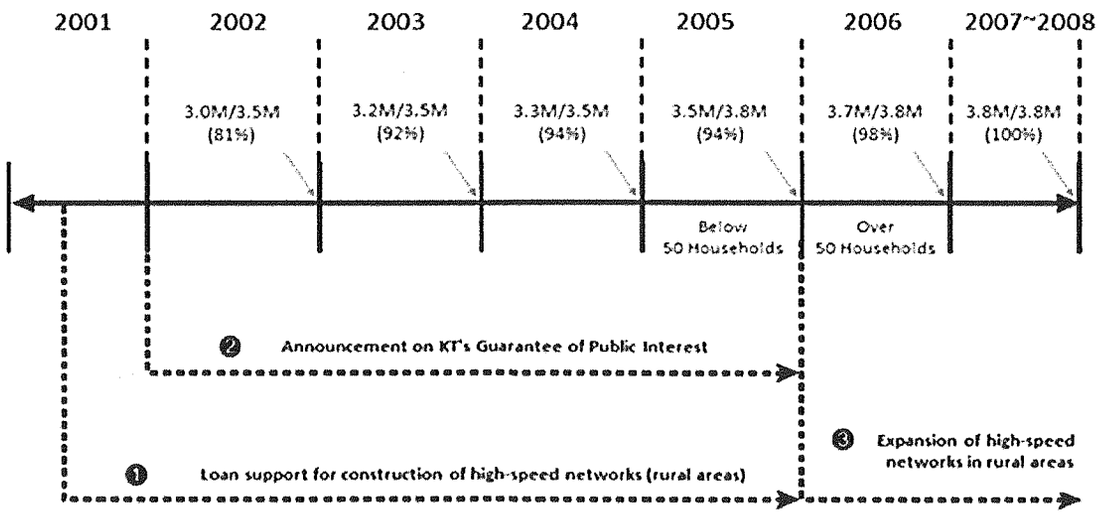
Policy for Building High-Speed Network in Rural Areas

As of the end of 2005, all primary, middle, and high schools across the country were connected to the Internet. All cities across the country were connected to fiber optic networks, and high-speed Internet was provided to even small towns. However, the information and communications infrastructure was very poor in rural areas including mountain villages and remote areas. As carriers were reluctant to invest in those areas due to low economic feasibility, the digital divide between rural and urban areas increased and became a serious social issue. It was also considered to hinder balanced national development. Against this backdrop, the government had to come up with measures to ensure equal access to information and communications service across the whole country.

The government made the "Announcement on Korea Telecom's Guarantee of Public Interest" (Announcement 2002-4) in January 2002 in order to place KT under an obligation to deploy high-speed networks in rural areas. As a result, as of the end of 2005, 94% or 3.53 million households out of 3.77 million rural households in the country came to enjoy high-speed Internet service, but the service was not available for a remaining 240,000 households.

As KT's obligation of guaranteeing public interest terminated in 2005, a new plan was formulated. The government decided to subsidize

Figure 3. Progress of high-speed network construction in rural areas



the construction of high-speed networks for the areas with those remaining households. From 2006 to 2008, the former Ministry Information and Communication (MIC), local governments, and KT formed a matching fund in the ratio of 1:1:2 to provide high-speed Internet service, including wired or two-way satellite Internet service to all areas nationwide.

The construction of high-speed networks in rural areas requires a huge amount of investment. But carriers often avoid investing in those areas because of few Internet users and low profitability. So the government had secured a budget for providing loans to carriers since 1999. By lending a portion of the cost for building high-speed public network at a low interest rate, the government eased the burden on carriers.

Policy for Constructing BcN in Rural Areas

As of 2011, Korea is recognized as an advanced country in terms of ICT infrastructure; it was ranked first in the OECD statistics on fiber/LAN broadband subscribers and on wireless broadband subscribers, and in the Broadband Quality Survey conducted by Oxford University.

As of 2011, 13.77 million subscribers or more than 90% of 15.2 million subscribers to wired broadband are using 100 Mbps broadband service and enjoying HD broadcast, video calls, and e-commerce via Internet service. In rural areas, only low-speed (xDSL) Internet service of less than 10 Mbps is being offered, making it impossible to provide various multimedia convergence services. These areas are hard to attract the voluntary investment of carriers, which are likely to pursue short-term profit, so the government should provide support for them.

In particular, since 2009 when IPTV service was first launched, the digital divide between rural and urban areas with regard to access to IPTV service was raised as a social issue. Against this backdrop, in the same year, the government established a plan for constructing BcN in rural areas to provide high-speed convergence services such as IPTV, VoIP, etc. For the project, the government and local governments have subsidized 50% of the total costs, and carriers have been charged with the remaining 50%.

The BcN construction project for rural areas is a cooperative project based on a matching fund system that involves the central government, local governments, and carriers. Such public-private cooperation is rarely witnessed in other countries where the central government leads the way in a large scale of broadband construction project.

If BcN is expanded to rural areas, both rural and urban residents will be able to enjoy broadcast and communications convergence services anytime, anywhere, and at affordable prices. Furthermore, it will contribute to developing a BcN utilization model for rural areas, realizing balanced development of rural and urban areas, providing support for people in settling in rural areas, stimulating the rural economy, and realizing social inclusion.

Critical Success Factors of ICT Infrastructure Construction in Korea

ICT infrastructure in an information society is necessary, just like basic infrastructure utilities such as; water supply, roads, and electricity. Countries around the world are enhancing their ICT infrastructure according to mid- and long-term plans with an aim to secure national competitiveness. Korea could build the world's best ICT infrastructure for a short period of less than a decade by continuously promoting relevant projects such as the construction of high-speed information and communications network ('95~'05), BcN ('04~'10), and Giga Internet ('09~) on the basis of public-private cooperation. Here are critical success factors of ICT infrastructure construction in Korea.

Strong Governance and Financing.

Building a future-oriented ICT infrastructure like broadband may be pushed lower on the the priority list for the allocation of resources. In this regard, the leader's will is very important, and it is required to establish a governance system for supporting the leader. As for Korea, the government established the Ministry of Information and Communication and included broadband construction in major national policies on the basis of the President's strong will and with an aim to be an advanced ICT country. This enabled the consistent implementation of informatization policy. Additionally, the government established the virtuous cycle of investment by taking the lead in investing in the initial broadband construction. And through the enactment of the Framework Act on Informatization Promotion in 1995, it established a legal basis upon which to accumulate a portion of spectrum charges and carriers' sales to finance broadband construction.

The Government's Leading Investment to Encourage Participation of PrivateSector.

In order to attract businesses' investment when future demand is uncertain, it is important for the government and the public sector to take the lead in investing in and using the infrastructure. As for Korea, the government played a leading role by investing KRW 805.5 in the project of constructing high-speed network. As a result, the communication expenses of government agencies were reduced by nearly KRW 3 trillion. Besides the direct effect, it created KRW 443.1 of added value and production inducement worth KRW 1,527.5 billion, promoting the private sector's investment.

The expansion of network construction via the leading investment by the government and a huge discount on service charges by using offset deposits contributed to realizing the expansion of high-speed network infrastructure and informatization in the public sector in a short period of time.

Demand Creation through Informatization and Education.

National and social informatization policy, which has been promoted in parallel with the construction of high-speed network, is meaningful in that it aims to create demand through informatization. If there had not been a rapid increase in demand, carriers would have delayed the construction of high-speed network.

The government made efforts to improve information literacy of all members of society by providing "ICT Education for 10 Million Citizens". As e-government service began at the end of 2002, people came to be provided with civil application services anytime and anywhere without having to visit public offices and submitting paper documents. Furthermore, the government provided all primary, middle, and high schools across the country with Internet service free of charge so that the Internet could be used for teaching and learning. In addition, it stimulated the digital economy such as online banking, online stock trading, electronic transactions, etc. by supporting the safe use of the Internet.

Cultural and Environmental Factors.

In Korea, geographic and cultural characteristics have played a key role in the development of high-speed network. Since most of the population lived in densely-populated cities, and nearly half of all households resided in large apartment complexes, high-speed Internet service could be expanded in a short period of time. Particularly, since more than 90% of residential areas were within the radius of 4Km from KT branches, there were few distance-related limits in building access networks. In addition, many Koreans tend to be early adopters with regards to new technologies and services, including new ICT infrastructure. PC cafes, which appeared for the first time in 1994, contributed to the adoption of high-speed Internet and to improving Internet accessibility for the general population.

Policy for Improving Information Literacy.

The Korean government has improved laws to close the digital divide while strengthening policy support for providing information access opportunities and for enhancing information literacy.

First of all, the government has constructed ICT centers and Internet Plazas, mainly in rural areas to offer equal information access opportunities. It has also improved information accessibility for information have-nots by providing 'used PCs (Green PC of Love)' and assistive ICT devices for the disabled. Besides, it has operated 'Computer Education Facilities for Rural Areas' since 1988, carried out 'ICT Education for 10 Million Citizens' since 2000 under the catchphrase, "People with the Highest Computer Literacy", and offered 'e-Korean Education' and 'Internet Education for One Million Housewives', contributing to significantly improving the information literacy of information have-nots.

Additionally, it has implemented ICT education for vulnerable groups, including the disabled, the elderly, low-income people, and rural residents. It has also provided ICT education service for new information have-nots such as rapidly increasing marriage-based immigrants and North Korean refugees.

As a result, the Internet usage rate of information have-nots, including the disabled, the elderly, low-income people, and rural residents increased by 25.1% from 19.2% in 2003 to 44.3% in 2010. And the computer penetration rate in the group also increased by 20.9% from 45.3% to 66.2%. Particularly, the comparative informatization level of the group to the general population increased from 45.0% in 2004 to 71.1% in 2010.

Improving Information Accessibility

Improving Web Accessibility.

The Korean government has promoted web accessibility standardization, conducted surveys on web accessibility status, developed web accessibility quality mark, and carried out professional training programs and consultation on web accessibility so that all people, including the disabled and the elderly can have access to the Internet without any restrictions. Furthermore, it enacted the Act on the Prohibition of Discrimination against Disabled Persons and Remedy against Infringement of Their Rights, etc., making it mandatory for public organizations from 2009 and the private sector from 2015 to provide convenience for the disabled in terms of web accessibility.

Since 2005, it has also conducted surveys of central administrative organizations, local autonomous entities and public organizations concerning web accessibility status in order to improve awareness of web accessibility and establish relevant policies. In 2010, it carried out the survey on web accessibility of 722 websites, including 50 websites of private companies, which were often used by citizens with disabilities.

Furthermore, the government has implemented the 'Web Accessibility Quality Mark' system since 2007 with aims to raise awareness of web accessibility and encourage voluntary participation of both public and private sectors. A quality mark is awarded after preliminary examination, expert examination, and user examination. The Quality Mark Certification Committee grants a quality mark to the website that passes through the three stages.

Providing Used PCs.

In order to reduce the digital divide resulted from financial ability, the government has received and repaired used PCs donated by public organizations, businesses or individuals, and then provided them to the socially disadvantaged. From 1997 to May 2011, a total of 346,206 used PCs were donated, and among them, 248,000 units were offered to less-developed countries as well as information have-nots in the country. (Informatization White Paper 2011:427)

Providing Telecommunications Relay Service for the Visually and Hearing Impaired.

Since November 2005, the government has provided telecommunication relay service (TRS) to support communications of the visually and hearing impaired. When a person with hearing or visual impairment calls the TRS center by using a text or video (sign language) message, an operator relays the message in voice to the called party on a real-time basis. This service has allowed persons with hearing or visual impairment to communicate with the non-disabled via a telephone in looking for a job, making a reservation, do the home shopping, etc.

At first, the service was offered to 200 people, but now is available 24/7/365 to nearly 21,000 people, and operators are relaying approximately 400,000 calls a year as of June 2011 by carrying out promotion and training activities, improving user convenience, and recruiting more operators (Informatization White Paper, 2011, p.428).

Providing Information and Communications Devices for the Disabled.

Since 2003, the government has distributed assistive ICT devices to disabled people who have difficulties in access to computers and the Internet. The devices are provided to the disabled specified by Article 32 of Welfare of Disabled Persons Act and persons whose wounds fall under the degree specified by the Act on the Honorable Treatment and Support of Persons, etc. of Distinguished Services to the State. The government subsidizes nearly 80% of the total cost of the devices, and a beneficiary bears the remaining 20%. For beneficiaries of National Basic Livelihood Subsidy and disabled persons in the second-lowest income bracket, the government shoulders about 90% of the cost.

From 2003 to 2010, a total of 28,935 devices were distributed, while the kinds of assistive devices increased from 10 kinds in 2003 to 41 in 2008 and 62 in 2011, providing opportunities for disabled persons to select devices appropriate for themselves.

Additionally, the government opened the IT Living Experience Center in 2010. Visitors can experience the application and utilization of assistive ICT devices in a workplace or in a school. The government also offered 103 assistive devices needed for early rehabilitation training and education to nine special schools for infants with disabilities.

To actively respond to the increasing domestic production of expensive assistive ICT devices and the need of the disabled, the government has supported private companies' development of assistive ICT devices. The 24 devices developed under the support of the government from 2004 have been commercialized and achieved sales of over KRW 12 billion (Informatization White Paper, 2011, p.429).

Expanding ICT Education.

When discussing the subject of the digital divide, "accessibility" used to be the main concern, which divides "those who own new ICT technologies" and "those who do not". Now, the discussion of the digital divide is developing beyond "accessibility" to include more detailed, multi-dimensional, and complex concerns.

"Common approach" for the digital divide in the past has developed to the question of "Who can and who can't" enjoy informatization, which has further evolved from "disparity in opportunity" to "disparity in utilization" and to "disparity in adoption". Therefore, to resolve the digital divide, information literacy of and accessibility for information have-nots must be improved.

To this end, the government planned and implemented "ICT Education Plan for 10 Million Citizens" in June 2000 to improve information literacy of the public and spread informatization across the country. Also, as a way to improve computer and Internet utilization capabilities, basic and vocational ICT education programs were carried out for all Korean nationals. In particular, ICT education for such information have-nots as the disabled, the elderly, rural residents was strongly supported by the government. At the same time, ICT education for students, government officials and soldiers whose ripple effect has been the biggest and implemented continuously. As a result, the goal of educating 10 million individuals was met in 2 years, earlier than planned, in June 2002. Despite the effort made by the government, it seemed that information have-nots such as the disabled and the elderly kept emerging and the digital divide was widening as informatization was in progress. In 2004, "ICT Education Plan for 5 Million in the Socially Disadvantaged" was prepared and implemented. In 2005, the "2nd Comprehensive Plan for Reducing the Digital Divide (2006-2010)" was established to narrow the digital divide especially for four groups in the socially disadvantaged - the disabled, low-income people, the elderly, and rural residents.

The digital divide, as the society gets informatized, is blamed for hindering social inclusion as it leads to the deterioration of quality of life and restricts opportunities of social engagement. The government, to resolve these issues, is offering ICT education programs for information have-nots such as the disabled and the elderly to improve the quality of life as well as improving their integration in society. It also keeps promoting ICT education for those people by developing and supporting customized education contents targeting each of those groups. (Informatization White Paper, 2011, pp.431-433).

ICT education for the disabled consists of three parts: classroom program covering PC and Internet usage; 1:1 at-home program for the severely disabled who cannot leave their homes; and vocational program for the disabled who are capable of having ICT jobs.

Also available are Information Helpers who repair PCs or eliminate computer virus for the disabled for free and consult on the selection of PCs, peripheral devices, and other assistive ICT devices. As a way to raise awareness of the ICT education for the disabled and motivate them, "ICT Competition for the Disabled" is held every year and participants compete on making documents and ICT knowledge.

The annual number of disabled persons that attended the education program came to a total of 3,099 in 1999, and kept increasing every year after that. The accumulated number of attendees reached 523,916 in June 2011. The accumulated number of inquiries, since 2004, that have been made to Information Help Center for the disabled was 101,169.

ilCT Education for the Elderly.

Rapid aging of the population is one of big social problems in Korea. In an informatized society, in particular, the digital divide for the elderly became an important issue that needs to be resolved for social inclusion. To resolve this issue, the government has implemented ICT education programs for the elderly from 2000, to improve information literacy of the elderly and encourage social engagement of the elderly.

The ICT education program for the elderly consists of two parts: Classroom program implemented at places to which the elderly can easily access and at facilities available at selected educational organizations; and Senior ICT Volunteer program where a peer-to-peer education service is provided by the information literate elderly.

A total of 489,823 individuals attended the ICT education for the elderly from 2000 to June 2011, and there are a total of 20 Senior IT Volunteer Groups in 2011.

ICT Education for Emerging Information Have-Nots.

Marriage-based Immigrants are emerging as a new group of information have-nots in the informatized society. This group has been steadily increasing recently as the total number of international marriages continues to rise, requiring their settlement within the society and policies to narrow the digital divide. To meet their needs, the government launched an ICT education program for marriage immigrants in 2006.

The ICT education program for multi-cultural families consists of two parts: Classroom program that covers basic ICT skills at governmental agencies or non-governmental organizations that run marriage immigrant education programs such as multi-cultural family support centers and community centers; and at-home education for immigrants who cannot come to the classroom due to language, accessibility, or family environment. Through the program, the government supports those marriage immigrants to settle down early in Korean society.

The program for emerging information have-nots attracted 11,690 marriage immigrants in the 5-year period, until June 2011.

ICT Education Instructors.

The government, since 1997, has nurtured a group of ICT education instructors consisting of volunteers. These ICT instructors are sent to welfare facilities, various organizations, and government agencies to teach information have-nots such as the disabled, the elderly, low-income people, and rural residents in free-of-charge classes.

A total of 587,324 individuals benefited from the ICT education programs from 1997 and June 2011, and the number of registered instructors as of June 2011 numbered 420.

ICT Education Infrastructure.

To build the infrastructure of ICT education, the Korean government established and operated an online ICT education site "Learning Country" in 2011. It also introduced "Development and Distribution of Education Contents" initiative, to develop and consult on subdivided programs to fit the attendees' interests and capabilities.

A free online ICT education system, "Learning Country (www.estudy.or.kr)"is available for all citizens as well as those information have-nots, and a total of 1.32 million individuals benefited from this program until June 2011.

To fully utilize the online ICT education, e-learning contents were provided to local governments and government agencies. To share the system resources, a remote training center became available for teachers, and online education was encouraged for police officers. Also, online contents exclusively for the visually and hearing impaired were developed, that considered their accessibility.

From 2011, the content for smart phones has become available in 15 courses as the number of smart phone users has increased at a rapid rate.

Improvement of Laws and Regulations.

The Korean government started to formulate policies to narrow the digital divide from 1996 in a way to boost welfare and social inclusion. Until the end of 1990s, the government had its focus on increasing the penetration rates of communications devices and building the infrastructure. From 2001 to 2005, the government implemented such policies as building high-speed network, information facilities, increasing the penetration rates of communications devices, under the "1st Comprehensive Plan for Reducing the Digital Divide", focusing on creating an information utilization environment easily accessed by the socially disadvantaged. From 2006 to 2010, the

government implemented various policies across all public organizations under the 2nd comprehensive plan, aiming at raising the comparative informatizatin level of the socially disadvantaged to the general population.

Key articles of the Act on Bridging Digital Divide were transferred to Paragraph 1, Chapter 4 of the Framework Act on National Informatization, which deals with the soundness and universality of information usage to prevent adverse effects of national informatization. In the passages below, there are some of important statutes for narrowing the digital divide.

Necessary plans must be prepared by the government and local autonomous entities to effectively guarantee the basic rights of all Korean nationals to access to and utilize communications service freely and usefully. (Article 31) Whereas the target of the digital divide improvement of the Act on Bridging Digital Divide is the socially disadvantaged, the Framework Act on National Informatization guarantees the rights of all Koreans to access to and utilize information, which is the essence of a knowledge and information society. The act also expands the target of the digital divide to all Koreans, providing the groundwork for future legislation that guarantees the accessibility and usage of information for all Koreans. The act also makes it mandatory for the government to develop a master plan for national informatization that includes a plan for closing the digital divide, every 5 years (Article 6), to implement the master plan every year (Article 7), and to establish "Presidential Council on Informatization Strategies" (co-chaired by the Prime Minister and a civilian expert) consisting of central government, constitutional institutions, and local autonomous body and civilian experts as an entity to manage and adjust national informatization policy and to review and confirm priorities among projects that help to narrow the digital divide (Article 9).

Also, the act aims at strengthening the web accessibility of public organizations for the disabled and the elderly. It makes it mandatory for carriers and handset makers to improve accessibility and convenience of ICT products and services for the disabled and the elderly. Also, it makes it mandatory for public organizations to try to purchase ICT products that guarantee information access and convenience of the disabled and the elderly (Article 32). Furthermore, it requires the government to develop guidelines to improve the accessibility and convenience of ICT products for the disabled and the elderly and to provide ICT products to low-income families and the disabled for free or with little charge. (Article 34)

For projects that are aimed at narrowing the digital divide to be effective, the budget must be obtained accordingly. For this, the government and local autonomous entities can support those projects financially with the budgets of the central and local governments (Article 12), and must submit research papers on the digital divide status and improvement progress to the parliament, so that the data can be used in making effective policies. (Article 43)

As we have seen, the Framework Act on National Informatization includes all major clauses such as basic principles, policies, universal service, development and diffusion of technologies to narrow the digital divide, education to narrow the digital divide, and securing financial resources. The act also strengthens the guarantee of rights of information have-nots by including a new clause on the duty of public organizations to guarantee web accessibility and purchase ICT products that bridge the digital divide (Digital Opportunity & Culture White Paper, 2009).

Best Practice: Policy for Isolated Regions .

To narrow the digital divide among regions and to improve the quality of life by strengthening the competitiveness of rural areas, the government started to build Information Network Villages (INVIL) from 2001. The project has developed to "Project for Fostering Sustainable Independent Communities" over the last decade, suggesting a new vision for rural areas and offering a new

regional development model. The project helped narrow the digital divide among regions and among social classes through information usage in daily rural lives and increase the sense of community unity; it also helped increase the income of rural villages and vitalize the rural economy through informatization such as the adoption of e-commerce.

In view of narrowing the digital divide, a total of 363 villages, as of the end of 2010, were designated as Information Network Villages, greatly raising the PC penetration rate among rural residents to 72.1%, which was higher than the average penetration rate (58.7%). The number of the homepage visitors and the number of postings in 2010 were 12.97 million and 2.81 million respectively. Residents' income levels rose as well, and the sales revenue from e-commerce was up 372% to KRW 20.9 billion from 2007, the starting year. (Informatization White Paper, 2011, p.434).

The "Chorok (Green)", one of Information Network Villages, built various e-business models such as Village Keeper, consulting service for idling farm land development, food processing and distribution business, and farm stay and was awarded "Stockholm Challenge Award 2002". Also, officials in charge of e-government from over 100 countries have visited to those areas to benchmark the rural area development and Korea was awarded "2006 World e-Gov Forum Trophy". The Information Villages play a key role in improving the status of IT Korea as the best practice of narrowing the digital divide among regions. (Informatization White Paper, 2011, p.435)

PROSPECTS: PREEMPTIVE PREPARATION WITH NEW TECHNOLOGIES FOR DIGITAL DIVIDE

As smart phones users are rapidly increasing, the digital divide concerning wired Internet service is now expanding to include the mobile Internet service. As of October 2011, there are more than 20 million smart phone users in Korea, which is safe to say that half of Korean adults are using smart phones. According to a survey in 2010, the smart phone usage rate (1.3%) of the socially disadvantaged against the rate of the general population (15.6%) remained at 8.3%. The survey also showed that 3 out of 10 socially disadvantaged people who do not use smart phones felt they are socially isolated. (2010 Digital Divide Index and Status Survey, NIA).

As the mobile digital divide emerges, special policies need to be prepared and implemented for the socially disadvantaged to use smart phones, as a preemptive action to minimize the social adverse effects.

Among the group who recognized smart phones, 7 out of 10 socially disadvantaged individuals agreed that a supportive policy is required for the socially disadvantaged to use smart phones. (Necessary: 72.3%). The number of respondents who said that they would use smart phones was 3.87 million (Willing: 22.8%), indicating that the demand was very high.

With the focus only on wired Internet and PC usage of the socially disadvantaged, it is difficult to keep increasing the Internet usage rate, whose annual increase is slowing down, and to create added value through informatization. Although more and more socially disadvantaged individuals are using the Internet, the annual rate of increase is declining year after year. Therefore, increasing smart phone usage, which does not require special PC competency, is an effective way of increasing the overall Internet usage for the socially disadvantaged.

To increase the willingness and interest in smart phones for the socially disadvantaged, benefits and needs should to be advertised and developed. It is advisable to consider incubating projects for developing, promoting, and spreading best practices on smart phone usage among the socially disadvantaged in such areas as social engagement, job, hobbies, networking, and convenience.

In particular, the digital divide in the mobile Internet requires the improvement of laws and regulations and the development of policies. To help the socially disadvantaged to access to and use the mobile Internet and encourage carriers to develop services, it is necessary to revise informatization and welfare laws as well as promoting service standardization. Also, carriers and local governments are required to establish wireless LAN infrastructure (Wi-Fi zone) in the residential areas of the socially disadvantaged and give subsidy for subscription cost of the socially disadvantaged in the mid- and long-term basis.

CONCLUSION

So far, informatization has helped the traditional governance to develop into a new governance. Many people were enabled to produce, share, and store a wide variety of information more easily. Now, it is time for us to establish new governance based on the principle of realizing an advanced society, where the socially disadvantaged can enter the middle class and become better off by utilizing informatization.

Thanks to the efforts made by various government ministries, the digital divide continues to decrease in size. Still, the information literacy and utilization level of the socially disadvantaged remains low. Moreover, as digital convergence and informatization progresses, it is becoming more important to better utilize material, human, and cultural resources. Therefore, making a qualitative difference about the digital divide issue is urgent, and relevant policies and efforts need to be strengthened to narrow the digital divide. In the knowledge-driven society, it is important to put one of the world's best information and communications infrastructure to good use in order to stimulate economic growth and boost national competitiveness. In this regard, the overall improvement of information literacy of the public is required as it can increase the convenience in citizens' everyday lives and can create added value. It is, therefore, necessary to continue the development of policies and projects to narrow the digital divide.

The Korean government plans to keep strengthening its support with policies to legislate regulations that narrow the digital divide and provide fair opportunities to access information, and to improve information literacy. Recently, many policies and initiatives have been prepared and implemented to narrow the digital divide in a national effort to realize a fair society. The efforts to narrow the digital divide and effective policies to achieve the goal must be continued to relieve social conflict and integrate the society.

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KEY TERMS AND DEFINITIONS

BcN: Broadband Convergence Network is a network that can provide 50Mbps to 100Mbps speed of Internet With it, a variety of convergence services such as IPTV became available.

Comprehensive Analysis Model of Digital Divide: Comprehensive analysis model of digital divide is applying the information demand and supply equilibrium model to analyze digital divide issues, which is a conceptual framework created by Seang-Tae KIM in order to explain the sources of the digital divide in a national level. This model consists of three domains including information policy divide, information supply divide and information demand divide. The comprehensive analysis of the digital divide among countries is enabled by connecting the information demand divide, the information supply divide, and the information policy divide.

Digital Divide: Digital divide refers to the "gap between people who obtain and use information through computers and those who do not" in a narrow sense, and the "phenomenon that inequality in information acquisition causes the disparity of wealth" in a broad sense.

Information Demand Divide: Information demand divide emphasizes social demand side sources of digital divide such as the information awareness gap, the information literacy gap, and the information purchase power gap.

Information Policy Divide: Information policy divide emphasizes the policy and institutional side sources of digital divide such as the gap in the information policy implementation system, and the gap in the legal and institutional foundation, etc.

Information Supply Divide: Information supply divide emphasizes the technologic supply side sources of digital divide such as the gap in the base for information transmission, the gap in the base for information distribution, and the gap in the base for information application. These gaps in the supply base are rooted in the gap in core technologies for information and communications and the gap in the technical workforce base.

IPTV: Internet Protocol Television is the process of transmitting and broadcasting television programs through the Internet using Internet Protocol. It allows interactive television services such as VoD.

KISA: Korea Internet Security Agency is a government subsidiary organization aiming to make Korea a safe and advanced Internet country by promoting Internet services and protecting information over internet.

KT: It is one of the largest Korean telecommunication operators, providing both wired and wireless telecommunication service. In particular, it is a dominant player in wired business, having the largest local telephone and high-speed internet businesses.

LAN: Local Area Network is a computer network that interconnects computers in a limited area such as office buildings.

NIA: National Information Society Agency is a core agency entrusted by the government with building the information society in Korea. It promotes national informatization and supporting development of related policies for national agencies and local authorities.

Social Inclusion: Social inclusion is defined as "the process of improving the ability: opportunity, and dignity of people, disadvantaged on the basis of their identity, to take part in society.

UHDTV: Ultra High Definition Television is the digital video format capable of carrying and presenting much more vivid contents.

VoIP: Voice over Internet Protocol is a group of technologies for the delivery of voice communications and multimedia sessions over the Internet using Internet Protocol.

xDSL: It refers to all types of digital subscriber lines including ADSL VDSL., HDSL and SDSL.